

Ferrite thermoresistors ....

S/142/62/005/001/002/012  
E192/E382

thus becomes an equation of the Bernoulli type. If it is assumed that the current is in the form:

$$i = I_0 + I_m \sin \omega t \quad (6)$$

the solution of Eq. (1) gives the following dynamic current-voltage characteristic:

$$U = IA \left\{ \frac{A}{H} \left( I_0^2 + \frac{I_m^2}{2} \right) + \frac{2 A I_0 I_m}{H \sqrt{1 + (\omega \tau_s)^2}} \sin \left[ \arcsin \left( \frac{I - I_0}{I_m} \right) - \varphi_1 \right] - \frac{A I_m^3}{2 H \sqrt{1 + (2\omega \tau_s)^2}} \cos \left[ 2 \arcsin \left( \frac{I - I_0}{I_m} \right) - \varphi_s \right] \right\}^{-\frac{n}{1+n}}. \quad (9)$$

Card 5/5

Ferrite thermoresistors ....

S/142/62/005/001/002/012  
E192/E382

where  $\tau = C/H$ ,

$$\tau_e = \tau / (1 + n),$$

$$\operatorname{tg} \varphi_1 = \omega \tau_e \quad \text{and}$$

$$\operatorname{tg} \varphi_2 = 2\omega \tau_e.$$

The above equation is employed to analyze a number of special cases, in particular, the case when  $I_m/I_0 \ll 1$ . In this case, the FTR behaves as an impedance consisting of a resistance  $r$  in series with a parallel combination of a resistance and an inductance. There are 10 figures.

ASSOCIATION: Kafedra teoreticheskikh osnov radiotekhniki  
Kiyevskogo ordena Lenina politekhnicheskogo  
instituta (Department of the Theoretical  
Principles of Radio-engineering of the Kiyev  
Order of Lenin Polytechnical Institute)

SUBMITTED: March 13, 1961 (initially)  
Card 4/5 July 8, 1961 (after revision)

S/109/62/007/005/005/021  
D201/D307

9.2571

AUTHOR: Bogdanov, G.B.

TITLE: Heating effects in ferrites at ferromagnetic resonant absorption of SHF power

PERIODICAL: Radiotekhnika i elektronika, v. 7, no. 5, 1962,  
806 - 811

TEXT: The author analyzes the high-power heating effects at SHF in a ferrite sphere, taking into account the temperature dependence both on magnetization saturation and magnetic losses. The thermal processes are analyzed by solving the differential equation of thermal balance of a ferrite sphere absorbing SHF power at resonance. Analysis shows that the above heating effects begin to appear at very low levels of the average SHF power. The dependence of a ferrite sphere on the amplitude of the external micro-wave magnetic field has pronounced non-linear character and exhibits a well-defined region of thermal saturation, the region beginning at a certain temperature of ferrite, which temperature may be called critical. This effect is ascribed to the fact that there exists a temperature  
Card 1/2

Heating effects in ferrites at ...

S/109/62/007/005/005/021  
D201/D307

at which the width  $2\Delta H$  of the resonant absorption line sharply increases and the ability of ferrite to absorb microwave power correspondingly decreases. As a result the increase of ferrite temperature above its critical value is possible only when the amplitude of the external microwave magnetic field is substantially increased. Since up to the Curie temperature the ferrite in these conditions is not heated, the temperature saturation region makes it possible to utilize ferrites at high average levels of microwave power. The formulas describing the steady-state and transient thermal processes and obtained in the present article, can be used for the design of various ferrite devices such as e.g. ferrite thermistors. Ya.A. Monosov and A.I. Pil'shchikov participated in discussion of the results. There are 4 figures and 1 table. ✓  
B

SUBMITTED: August 18, 1961

Card 2/2

9.2571

S/109/62<sup>391,29</sup>/007/008/008/015  
D409/D301

AUTHOR: Bogdanov, G.B.

TITLE: On a generalization of the basic formulas of ferromagnetic resonance absorption in ferrites

PERIODICAL: Radiotekhnika i elektronika, v. 7, no. 8, 1962, 1340-1348

TEXT: Generalized formulas are obtained for the ferromagnetic-resonance frequency and for the microwave energy  $P$ , absorbed by the ferrites, allowance being made for the heat dependence of the ferromagnetic resonance. The formulas are derived for disk-shaped and spherical specimens. Simplifying assumptions are made and the Landau-Lifshitz equation used. In the case of a disk-shaped ferrite, one obtains for the ferromagnetic-resonance frequency the formula

$$\omega = \gamma \sqrt{H_0^2 + H_0(4\pi M_0 + \beta_M \theta) - \frac{1}{4}(2\Delta H' + \beta_H \theta)^2}, \quad (12)$$

where  $H$  is the magnetic field,  $M$  the magnetization,  $\theta$  the temperature.  
Card 1/4

S/109/62/007/008/008/015  
D409/D301

On a generalization ...

ture of the ferrite,  $\gamma$  a quantity related to the magnetic losses and  $H$ ,  $2 H'$  the width of the resonance curve, and  $\beta$  - the temperature coefficients. Other formulas are derived for the resonance values of the magnetization variables  $M_x$  and  $M_y$ . In the case of a spherical ferrite, one obtains for the resonance frequency

$$\omega = \gamma \sqrt{H_0^2 - \frac{1}{4}(2\Delta H' + \beta_H \theta)^2} \quad (19)$$

The generalized formulas for the microwave energy, absorbed by the ferrite, are derived. In the case of a disk:

$$P_F = \frac{(4\pi M_0 + \beta_M \theta) [H_0 + (4\pi M_0 + \beta_M \theta)]}{(2\Delta H' + \beta_H \theta) [2H_0 + (4\pi M_0 + \beta_M \theta)]} f V_F h^2 5 \cdot 10^{-8}, \quad (26)$$

where  $V_F$  is the volume of the ferrite and  $f$  the frequency of the external (variable) magnetic field. An analogous formula is obtain-

Card 2/4

S/109/62/007/008/008/015  
D409/D301

On a generalization ...

ed for a spherical ferrite. The above generalized formulas can be used for actual calculations, if the magnitude and sign of  $\beta$  are known, as well as the relation between  $\theta$  and the amplitude  $h$  of the variable magnetic field. A figure shows the temperature and amplitude ( $h$ ) dependence of the saturation magnetization  $4\pi M$  and of the width of the resonance curve  $2\Delta H$ , for a ferrite ( $\text{Fe}_2\text{O}_3$  -  $\text{MnO}$  -  $\text{MgO}$ ) single-crystal; these curves differ substantially from the corresponding curves, obtained as a result of heating the ferrite by an external heat-source. Further, the generalized formulas are compared with formulas in which the temperature dependence of ferromagnetic resonance-absorption is not taken into account. This comparison led to the following conclusions: The dependence of the frequency  $\omega$  on the microwave energy, absorbed by the ferrite, appears already at very low power-levels (hundreds of microwatts). In the case of disk-shaped specimens, this dependence leads to a 40-50% decrease in  $\omega$ , on heating the ferrite to a temperature of about  $200^\circ\text{C}$  ( $h \approx 0.05$  oersted). For spherical specimens, the dependence appears when the width of the resonance curve is considerable, as compared to  $H_0$ . The error in determining  $\omega$  without making

Card 3/4

On a generalization ...

S/109/62/007/008/008/015  
D409/D301

allowance for the heat effect, can exceed 50%. In calculating  $P_f$ , it is necessary also to make allowance for the heat effect. Formulas which do not provide for this, yield errors up to 1000%, and do not reflect the nonlinear effects, due to the heat factor. There are 5 figures.

SUBMITTED: December 30, 1961

X

Card 4/4



BOGDANOV, G.B.

Use of ferrites in solving problems of measurement techniques.  
Izm.tekh. no.1:33-37 Ja '63. (MIRA 16:2)  
(Measuring instruments) (Ferrates)

BOGDANOV, G. B.

Temperature of a sphere-shaped ferrite heated by microwave  
power absorbed at ferromagnetic resonance. Radiotekh. i elektron.  
8 no.1:181-183C Ja '63. (MIRA 16:1)

(Microwaves) (Ferrates)

BOGDANOV, G.B.; VORONOV, Yu.K.

Measurement of microwave power using ferrites. Radiotekh.  
i elektron. 8 no.11:1952-1955 N '63. (MIRA 17:1)

~~BOGDANOV, Georgiy Brunovich~~, kand. tekhn. nauk; BOKRINSKAYA,  
Aleksandra Akimovna, kand. tekhn. nauk; AFANAS'YEV,  
Yu.N., kand. tekhn. nauk, retsenzent

[Ferrite thermistors] Ferritovye termistory. Kiev, Gos-  
tekhizdat USSR, 1964. 190 p. (MIRA 17:6)

BOGDANOV, G.B.; VORONOV, Yu.K.

One method for designing waveguides with ferrites and a  
high reaction. Radiotekh. i elektron. 10 no.5:943-945 My  
'65. (MIRA 18:5)

L 7997-66 EWT(d)/EEC(k)-2

ACC NR: AP5026500

SOURCE CODE: UR/0286/65/000/019/0029/0029

AUTHORS: Bogdanov, G. B.; Voronov, Yu. K.

ORG: none

TITLE: Device for measuring superhigh frequency power. Class 21, No. 175093

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 19, 1965, 29

TOPIC TAGS: decimeter wave, power meter, superhigh frequency

ABSTRACT: This Author Certificate presents a device for measuring superhigh frequency power in the decimeter wave range. The device consists of a ferrite detector whose temperature changes with heating by the absorbed superhigh frequency power and a device recording this temperature change. To increase the frequency discrimination of the device, the ferrite detector is in the form of a disk operating in the ferromagnetic resonance region.

SUB CODE: EC/

SUM DATE: 14Aug64

nw  
Card 1/1

UDC: 621.317.38

ACC NR: AP7002015

SOURCE CODE: UR/0142/66/009/005/0583/0590

AUTHOR: Bogdanov, G. B.

ORG: none

TITLE: Effect of temperature autostabilization of ferrites and ferroelectrics

SOURCE: IVUZ. Radiotekhnika, v. 9, no. 5, 1966, 583-590

TOPIC TAGS: ferrite, ferroelectric, thermal stability

ABSTRACT: By considering thermal processes in a small ferrite sphere (inside temperature distribution is neglected), these conditions of existence of temperature autostabilization are deduced:  $\theta_0 < \theta_k$  and  $\frac{\Lambda h^2 \eta_0^2(\theta_0)}{k + \Lambda h^2 \alpha} \rightarrow \theta_k$  with  $h^2 \gg 0$ . In other words, the ambient temperature  $\theta_0$  should always be lower than the Curie temperature of the ferrite; the temperature  $\theta_i$  of the ferrite heated by SHF power, under ferromagnetic-resonance conditions, should approach  $\theta_k$  as closely as possible. The temperature autostabilization of a ferroelectric occurs at a certain level of SHF power inside the ferroelectric near its Curie point (A. Glanc et al., J. Phys., 1964,

Card 1/2

UDC: 538.245:537.226.33

ACC NR: AP7002015

35, 1870). An equation describing this phenomenon has this form:  $\theta_c = \theta_0 + \theta(0) - \lg \beta \theta_0$ . Obviously, the complete compensation of the effect of  $\theta_0$  on  $\theta_c$  happens when  $\beta = 45^\circ$ . The same equation can be used to describe the autostabilization of ferrites. As an experimental verification, a ferrite thermistor was tested at 30, 70, 125, 155C (Curie point, 270C) and 10, 50, 100 kc; its static I-V characteristics and resistance-temperature characteristics at the above frequencies are shown. Orig. art. has: 6 figures and 27 formulas.

SUB CODE: 09,29 / SUBM DATE: 23Nov64 / ORIG REF: 003 / OTH REF: 001

Cord 2/2



ACC NR: AP7002673

SOURCE CODE: UR/0109/67/012/001/0137/0139

AUTHOR: Bogdanov, G. B.; Vedrigan, V. Ye.

ORG: none

TITLE: Thermal stability of the resonant frequency of spherical SHF-resonators

SOURCE: Radiotekhnika i elektronika, v. 12, no. 1, 1967, 137-139

TOPIC TAGS: ferroelectric material, ferroelectric property, superhigh frequency, microwave component

ABSTRACT:

Thermal stability of the resonant frequency of spherical ferrite resonators was studied. A ferrite resonator (parameters:  $2\Delta H = 100$  a/m;  $M_0 = 1.4 \times 10^5$  a/m;  $d = 1.2$  mm) was placed in a circular polarization plane of the electromagnetic field located in a round opening in a single-mesh waveguide filter. The effects of the round opening on the ferromagnetic resonator were neglected. Temperature dependence of the anisotropic frequency deviation  $\Delta f$  on the isotropic resonance frequency corresponding to the coordinate origin of the filter was determined experimentally (see Fig. 1).

Card 1/2

UDC: 621.372.413.001.5

ACC NR: AP7002673

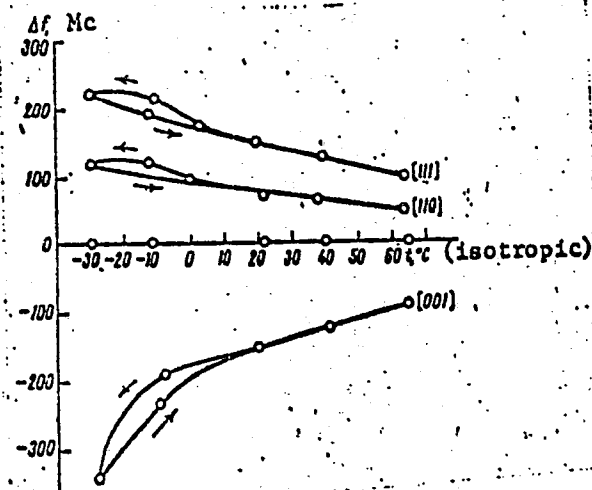


Fig. 1. Temperature dependence of the anisotropic frequency deviation  $\Delta f$  on the isotropic resonance frequency

A temperature hysteresis of the anisotropic deviations was found in the negative temperature region. Average temperature drift for the [111], [110], and [001] axes was -1.2, -0.1, and -1.5 Mc/C, respectively, but for the isotropic axis it was tens of megacycles (such small slopes cannot be seen in Fig. 1). Orientation of ferrite resonators along their isotropic resonance axis is fully effective only for narrow-band applications, owing to the occurrence of some non-uniform processes in the ferromagnetic material. Orig. art. has: 3 figures.

SUB CODE: 09/ SUBM DATE: 14Jun66/ ORIG REF: 001/ OTH REF: 001/ ATD PRESS: 5111  
Card 2/2

BOGDANOV, G.D., inzh.

Results of a year's operation of the bottom galleries of a  
concrete dam. Gidr.stroi. 32 no.9:25-29 S '62.

(MIRA 16:2)

(Dams)

BOGDANOV, G.D., inzh.

Construction of hydraulic metal structures. Energ. stroi. no.42:  
52-60 '64. (MIRA 18:3)

VOINOV, I.I.; SLASTENOV, Ye.P., dotsent, zaveduyushchiy; BOGDANOV, G.F., direktor.

The problem of the "Heidelberg" infection. Biological characteristics of bacilli of the serological group of paratyphus B Heidelberg, excreted in diarrhea in newborn and in infants. Zhur.mikrobiol.epid.i immun. no.3:53-57 Mr '53. (MLRA 6:6)

1. Epidemiologicheskii otdel Sverdlovskogo oblastnogo instituta mikrobiologii i epidemiologii (for Slastenov). 2. Sverdlovskiy oblastnyy institut mikrobiologii i epidemiologii (for Bogdanov). (Paratyphoid fever) (Diarrhea)

BOGDANOV, G.F., red.; BYCHKOVSKAYA, O.V., red.; ZERCHANINOV, L.K.,  
red.; MEDVINSKAYA, K.G., red.; PERETTS, L.G., prof., red.;  
PUSHKAREVA, Z.V., red.; DAVYDOVA, I., red.; PAL'MINA, N.,  
tekhn.red.

[Increasing the activity of antibiotics, sulfonamides, and  
blood serum; collection of articles] Uvelichenie aktivnosti  
antibiotikov, sul'famidov i krovianoi syvorotki; sbornik statei.  
Sverdlovsk, 1957. 205 p. (MIRA 13:1)

1. Sverdlovskiy nauchno-issledovatel'skiy institut antibiotikov.  
(ANTIBIOTICS) (SULFONAMIDES) (SERUM)

~~BOGDANOV, G.~~

Dangers of x-rays for orthopedists and traumatologists and their patients. Khirurgia, Sofia 10 no.4:312-320 1957.

1. Okruzhna bolnitsa V. Kolarov - Kolarovgrad Gl. lekar: St. Nikolov.  
(RADIATION PROTECTION  
for surgeons & their patients (Bul))

BYCHKOVSKAYA, O.V.; BAZHEDOMOVA, M.A.; BABINA, N.S.; BOGDANOV, G.F.;  
SEMENOVA, N.S.

Effect of some acridine derivatives on the poliomyelitis and murine  
encephalomyelitis viruses. Vop. virus. 6 no.6:736-738 N-D '61.  
(MIRA 15:2)

1. Sverdlovskiy nauchno-issledovatel'skiy institut po profilaktike  
poliomiyeleta.  
(ENCEPHALOMYELITIS) (POLIOMYELITIS)  
(ACRIDINE)



BOGDANOV, G.F.; MAKSIMENKO, B.P.

Use of surface-barrier detectors for measuring the spectra  
of fast particles. Atom. energ. 19 no.5:449 N '65.

(MIRA 18:12)

BOGDANOV, G.F.  
OKHOTIN, V.V.; BOGDANOV, G.F.

Microaggregate analysis of soils. Uch.zap. LGU no.93:259-274  
'48. - (MIRA 10:10)  
(Soils--Analysis)

BOGDANOV, G.F.

~~Basis of methods for determining the plasticity of soils.~~ Uch.zap.  
Len.un. no.102:171-182 '50. (MIRA 10:1)  
(Soil physics)

BOGDANOV, G.F.

OKHOTIN, V.V.; BOGDANOV, G.F.

Methods for determining friction and cohesion in soils. Uch.zap.Len.  
un. no.102:183-198 '50. (MIRA 10:1)

(Soil physics)

OKHOTIN, V.V.; BOGDANOV, G.F.

**Basis of the microaggregate method of subsoil analysis.**  
Uch.zap.Len.un. no.159:93-109 '53. (MLRA 9:6)  
(Soils--Analysis)

*BOGDANOV, G. F.*

Category : USSR/Nuclear Physics - Instruments and Installations. Methods of Measurement and Investigation C-2

Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 281

Author : Bogdanov, G.F., Murashov, A.A., Ryubakov, B.V., Sidorov, B.A.

Title : Time of Flight Measurement of the Spectra of Fast Neutrons

Orig Pub : Atom. energiya, 1956, No 1, 66-74

Abstract : Description of a setup for the study of spectra of fast neutrons, formed in various nuclear reactions, using the time of flight method. The pulsed source of charged particles is a 1-1/2 meter cyclotron. The emerging beam of particles is focused by a magnetic prism at a distance of 12 meters from the cyclotron. The repetition period of the particle pulses is 112 millimicroseconds (the frequency of the accelerating voltage is 8.9 mc). The duration of the pulse of particles on the target does not exceed 5 millimicroseconds. The neutrons and gamma rays are detected by a scintillation counter, consisting of a plastic scintillator (terphenyl in polystyrol) and a photomultiplier. The instant at which the counter records the particle is shifted relative to the instant at which it leaves the target by the time of flight of the

Card : 1/2

Category : USSR/Nuclear Physics - Instruments and Installations. Methods of Measurement and Investigation C-2

Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 281

particle over the distance from the target to the counter.

The pulses from the counter are applied to a fast coincidence counter, the second arm of which receives pulses that are synchronized with the accelerating voltage of the cyclotron. By changing the value of the delay of these pulses, it is possible to record particles with various times of flight. The instant at which the particle leaves the target is determined from the time the pulses are produced by the gamma quanta formed as a result of the reaction, making it unnecessary to use special phasing of the circuit. The resolution time of the spectrometer is 7 millimicroseconds. The energy resolving power of the spectrometer with a flight distance of three meters amounts to 16% for 7 Mev neutrons. The spectral sensitivity of the setup is of the form  $\eta(E) = A \sigma_{np}(E) (1-B/E)$ . To determine the constants A and B the spectrometer was calibrated with a known electron stream, formed by the  $T(p,n)He^3$  reaction.

Card : 2/2

Neutron spectra from the bombardment of mercury and 5



*Bogdanov, G.F.*  
USSR/Nuclear Physics - Structure and Properties of Nuclei

C-4

Abst Journal : Referat Zhur - Fizika, No 12, 1956, 33990

Author : Bogdanov, G. F., Vlasov, N. A., Kalinin, S. P., Rybakov, B. V.  
Sidorov, V. A.

Institution: None

Title: Spectra of Neutrons Bombarded with T and D Deuterons with  
Energies of 14 Mev

Original

Periodical: Zh. eksperim. i teor. fiziki, 1956, 30, No 1, 185-187

To check the existing experimental data on the existence of an excited state of approximately 2 Mev in the  $\text{He}^4$  nucleus, spectra were studied of neutrons produced by the  $\text{T(d,n) He}^4$  and  $\text{D(d,n) He}^3$  reactions, with the neutrons escaping at an angle of  $0^\circ$  relative to the beam of the deuterons. The beam of the 14 Mev deuterons was focused with the aid of a magnetic prism at a distance of 12 m from the cyclotron, where a thin tritium-zirconium or a gas deuterium target was placed. The energy of the neutrons

Card 1/3

USSR/Nuclear Physics - Structure and Properties of Nuclei

C-4

Abst Journal : Referat Zhur - Fizika, No 12, 1966, 33990

was measured from the time it took them to cover the distance from the target to the counter, the latter being a photomultiplier with a solid solution of terphenyl in polystyrol acting as a phosphor. The neutron source was operating under pulse conditions based on the natural modulation of the cyclotron beam. The pulses from the counter went to a germanium-diode coincidence circuit. Pulses, synchronized with the accelerating voltage of the cyclotron were applied to the second leg of the coincidence circuit. The time resolution of this spectrometer (width of gamma line at half the altitude) amounted to 7  $\mu$ -seconds.

The spectrum of the neutrons from the  $T(d,n) He^4$  and  $D(d,n)He^3$  reactions displayed not only the maxima corresponding to the formation of the  $He^4$  and  $He^3$  nuclei in their fundamental states but also wide groups of slower neutrons with an average of energy of 8 Mev. For the  $T + d$  reaction this energy corresponds to an excitation energy of finite nucleus of approximately 22 Mev. However, the similarity of the spectra in

Card 2/3

USSR/Nuclear Physics - Structure and Properties of Nuclei

C-4

Abst Journal : Referat Zhur - Fizika, No 12, 1956, 33990

the case of both reactions is indication in favor of the assumption that the second groups of neutrons are formed faster by a break-up of the deuteron than by the usual reaction with a formation of a finite nucleus  $\text{He}^4$  and  $\text{He}^3$  in excited state. Notice is taken of the large value of the cross section for the formation of the neutrons of the second groups. This amounts to 300 millibarns/steradian for the case of the  $\text{T} + \text{d}$  reaction, and 100 millibarns/steradian for the case of the  $\text{D} + \text{d}$  reaction.

Card 3/3

Category : USSR/Nuclear Physics - Nuclear Reactions

C-5

Abs Jour : Ref Zhur - Fizika, No 2, 1957 No 3252

energy of 2.5 Mev, corresponding to the spin-orbit splitting. The cross sections of the formation of neutrons escaping at  $0^\circ$  to the deuteron beam are estimated. This cross section is approximately 50 millibarns/steradian per nucleon for all the light elements investigated, with the exception of T, i.e., it is approximately proportional to the number of nucleons in the nucleus. The cross section diminishes for the heavier elements; it is only 200 millibarns/steradian for Cu.

Card : 2/2

BOGDANOV, G. F., VLASOV, N. A., KALININ, S. P., RIBAKOV, B. V., and SIDOROV, V. A.

"The Spectra of the Fast Neutrons from (p,n) Reactions are Measured on the 1.5 Meter Cyclotron by the Time-of-Flight-Method," a paper presented at the International Conference on the Neutron Interactions with the Nucleus , New York City, 9-13 Sep 57,

Abstract available in C-3,800,344

BOGDANOV, G. F., VLASOV, N. A., KALININ, S. P., RIBAKOV, B. V., AND SIDOROV, V. A.

"Time-of-Flight Analysis of the Reaction of 10 Mev Deuterons with Light Nuclei," a paper submitted at the International Conference on the Neutron Interactions with the Nucleus, New York City, 9-13 Sep 57

Abstract available in C-3,800,344

BOGDANOV, G.F., ARTEMOV, K.P., KALININ, S.P., RYBAKOV, B.V., SIDOROV, V.A.  
VLASOV, V.A.

"Spectra of Neutrons and Protons from ( $\text{He}^4 + d$ ) Reaction and Energy Levels of  $\text{Li}^5$  and  $\text{He}^5$ ."

paper submitted at the All-Union Conf. on Nuclear Reactions in Medium and Low Energy Physics, Moscow, 19-27 November 1957.

BOGDANOV, G.F., KALININ, S.P., RYBAKOV, B.V., SIDOROV, M.A., VLASOV, N.A.

"The (p.n.) Reaction on Lithium and the Ground State of  $\text{Be}^6$ ."

paper submitted at the All-Union Conf. on Nuclear Reactions in Medium and Low Energy Physics, Moscow, 19-27 November 1957.



BOGDANOV, G.F.

PHASE I BOOK EXPLOITATION

296

Yadernyye reaktsii na legkikh yadrakh (Nuclear Reactions in Light Nuclei) Moscow, Atomizdat, 1957. 98 p. (Series: Atomnaya energiya. Prilozheniye, 1957, no. 5) 9,000 copies printed.

Resp. Ed.: Bogdanov, G.F.; Literary Ed.: Semenova, G.F.; Tech. Ed.: Usachev, G.A.

PURPOSE: This collection of articles is intended for specialists in the field of nuclear reactions.

COVERAGE: These articles are devoted to the problem of nuclear reactions of light nuclei. A study was made of the D - D and D - T reactions and the results obtained were compared with other contemporary data. Several articles are concerned with the interactions of neutrons with light nuclei.

TABLE OF CONTENTS:

5

From the Editor

Card 1/10

Nuclear Reactions in Light Nuclei 296

Davidenko, V.A., Kucher, A.M., Pogrebov, I.S., and Tuturov, Yu. F. Determination of the Total Cross Sections of the  $D(d,n)He^3$  Reaction in the Energy Range of 20-220 Kev 7

The paper presents results of a study of the excitation curve of the  $D(d,n)He^3$  reaction in the range of deuteron energies from 20 - 220 Kev. Measurements were performed in 1950 - 1951 on thick  $D_2O$  ice targets. The neutron count was made by the integration method in a tank filled with  $KMnO_4$  solution. The neutron count was used for the determination of the reaction cross section. The results are shown in fig. 3 and are in agreement with results given by other researchers. There are 3 figures, 1 table, and 16 references, 1 of which is Soviet, 12 English, 1 German, and 1 Scandanavian.

Volkov, V.V., Vorotnikov, P.Ye., Koltypin, Ye. A., Sidorov, N.I., and Yan'kov, G.B. Study of the  $D - D$  Reaction in the Range of Deuteron Energies From 0.20 - 1.75 Mev 15

Card 2/10

## Nuclear Reactions in Light Nuclei 296

The paper quotes measurements of angular distributions and effective cross sections of the  $D(d,p)T$  reaction in the range of deuteron energies from 0.20 - 1.75 Mev. Comparison of the differential cross sections of the  $D(d,p)T$  and  $D(d,n)He^3$  reactions at an angle of  $90^\circ$  to the deuteron beam, measurement of the angular distribution of neutrons for the  $D(d,n)He^3$  reaction, and the ratio of total cross sections of the proton and neutron branches in the  $D - D$  reaction, were defined for the three values of deuteron energy. The authors completed their work in the laboratory of Professor Gokhberg, B.M. There are 8 figures, 3 tables, and 16 references, 4 of which are Soviet, and 12 English.

Ganeyev, A.S., Govorov, A.M., Osetinskiy, G.M., Rakivnenko, A.N., Sizov, I.V., and Saksin, V.S. The D-D Reaction in the Range of Deuteron Energies from 100- 1000 Kev. 26

Card 3/10

## Nuclear Reactions in Light Nuclei 296

The authors describe experiments in which both branches of the D - D reaction in the range of deuteron energies from 100 - 1000 Kev were investigated. They measured total cross sections, ratios of total cross sections, and the angular distribution of  $D(d,p)T$  and  $D(d,n)He^3$  reaction products. The measurement of angular distributions was made by counting the charged particles in a thin gas target. Total cross sections were determined by the integration of angular distributions. The total cross section in the  $D(d,n)He^3$  reaction was measured by the method of physical integration of neutrons in a tank with  $KMnO_4$  solution. Schematic diagrams of apparatus are given. Values obtained for the total cross sections of both branches agree with results of Davidenko, Wenzel and Whaling, Blair, etc. Personalities mentioned are: Alekseyevskiy, N.Ye., Professor (IFP AN SSSR), in whose laboratory the mass-spectrographic analysis of deuterium was made, and Meshcheryakov M.G., Corresponding Member, AS USSR, consultant. There are 20 figures, 1 table, and 19 references, 1 of which is Soviet, 15 English, 2 Scandinavian, and 1 German.

Card 4/10

Nuclear Reactions in Light Nuclei 296

Balabanov, Ye.M., Barit, I.Ya., Katsaurov, L.N., Frank, I.M.,  
and Shtranikh, I.V. Measurement of the Yields and Effective  
Cross Sections of the  $D(t,n)He^+$  and  $D(d,p)T$  Reactions for a  
Thick  $D_2O$  Ice Target

48

The paper, completed in 1951, considers the yield of products of this reaction from a thick ice target bombarded with 50 - 200 Kev tritons (deuteron-energy scale). The cross sections for most of the energy range showed a lowering of 10 percent as compared with results for a gas target. In the high-energy range the deviation reached 20 percent. It is recommended to increase the value for the effective cross section of the  $D - T$  reaction by 10 percent in the energy range up to 200 Kev, and by 20 percent at 300 Kev. This work was done at the Institute of Physics, AS USSR. There are 5 figures and 15 references, 1 of which is Soviet, and 14 English.

Balabanov, Ye.M., Barit, I.Ya., Katsaurov, L.N., Frank, I.M.,  
and Shtranikh, I.V. Measurement of the Effective Cross Sections

Card 5/10

Nuclear Reactions in Light Nuclei 296

for the  $D(t,n)He^4$  Reaction in the Range of Deuteron Energies  
From 40 - 730 Kev

57

The paper considers the effect of bombarding  $\alpha$ -particle energies on the yield and cross section of the reaction as measured by means of thin tritium-zirconium targets. The absolute values for the cross sections were measured by means of a gas-flow target. The flow target was filled with deuterium and bombarded with accelerated tritons. The maximum yield was determined at 106 Kev in the deuteron-energy scale (159 in the triton-energy scale). A diagram is given of the apparatus used in the experiment. Personalities mentioned are: Davidenko, V.A., Pogrebov, I.S., Saukov, A.I., Val'ter, A.K., and Klyucharov, A.P., of the Khar'kov Physical and Technical Institute (Khar'kovskiy fiziko-tekhnicheskiy institut); Barit, I.Ya. and Balashko, Yu.G. from the Institute of Physics, AS USSR. This work was done at the Institute of Physics, AS USSR, with the

Card 6/10

Nuclear Reactions in Light Nuclei 296

cooperation of Bergman, A.A., Popov, V.I., and Kuritso, G.A. There are 2 figures, 5 tables, and 15 references, 3 of which are Soviet, and 12 English.

Katsaurov, L.N., Musayelyan, L.N., Popov, V.I. Total Effective Cross Section of Tritium for 2.5 and 14 Mev Neutrons 71

Measurements of the total cross sections for tritium were performed at the Institute of Physics, AS USSR, in 1954. The results for 2.5 and 14 Mev neutrons are in good agreement with those given by Hughes and Harvey. Personalities mentioned are: Golovin, V.N., Engineer, and Shtranikh, I.V., who helped in developing details of apparatus used. There is one table and 6 references, all of them English.

Yelpidinskiy, A.V., Shapiro, F.L., Shtranikh, I.V. Measurement of the Effective Cross Section of the  $\text{Li}^6(n,\alpha)$  Reaction for 2.5 Mev Neutrons 75

Card 7/10

Nuclear Reactions in Light Nuclei 296

The article is concerned with the measurement of the effective cross section for the  $\text{Li}^6(n,\alpha)$  reaction for 2.5 Mev neutrons. The authors obtained the following value for the cross section of the  $\text{Li}^6(n,\alpha)\text{T}$  reaction for D - D neutrons (energy 2.5 Mev):

$$\sigma = (170 \pm 20) \cdot 10^{-27} \text{ cm}^2.$$

This result agrees with data of Ribe and with data obtained in 1953 by Tolstoy, K.D., Romanov, T.A., Perelygin, V.P., Tikhomirov, F.A., Frank, I.M., and Popov, N.V., at the Institute of Physics, AS USSR. The present work was also accomplished at this insitute. The first supplement to the article gives the calculation of distribution made from the total energy of slow neutron-lithium fission products. The second supplement considers monoenergetic fast neutrons instead of slow neutrons. There are 8 figures, 2 supplements, and 6 references, all of them English.

Card .8/10



Nuclear Reactions in Light Nuclei 296

Katsaurov, L.N., Musayelyan, R.M., Popov, V.I. Total Effective Cross Sections of  $\text{Li}^6$  and  $\text{Li}^7$  for 2.5 and 14 Mev Neutrons 90

The paper presents the results of measurements of total cross sections of  $\text{T}$ ,  $\text{Li}^6$  and  $\text{Li}^7$  for 2.5 and 14 Mev neutrons, and compares them with results of Coon et al., Hughes and Harvey, and Johnson et al. There is good agreement for all data except for  $\text{Li}^6$  at 2.5 Mev. This work was done at the Institute of Physics, AS USSR, with the cooperation of Shtranikh, I.V., and his co-workers. There is 1 table and 8 references, all of them English.

Vasil'yev, S.S., Komarov, V.V., Popova, A.M. Effective Cross Section of the  $\text{Be}^9(\text{n},\alpha)\text{He}^6$  Reaction 92

The paper presents data on the effective cross section of the  $\text{Be}^9(\text{n},\alpha)\text{He}^6$  for the 1 - 7 Mev neutrons. Results are given in a table. There are 5 references, 1 of which is Soviet, 4 English.

Card 9/10

Nuclear Reactions in Light Nuclei 296

Osetinskiy, G.M. Specific Stopping Power in Nickel for  
150 - 1100 Kev Protons

94

The article deals with the measurement of proton energy losses in nickel foil. The results given in a table show that they are 7 per cent higher than results obtained by means of a magnetic spectrometer. Chepurchenko, I.A., and Savenkova, M.V. participated in this work. There are 3 figures, 2 tables, and 15 references, 2 of which are Soviet, 12 English, and 1 German.

AVAILABLE: Library of Congress

Card 10/10

BK/ksv  
10-14-58

BOGDANOV, G. F. Cand Phys-Math Sci --- (diss) "~~the~~ Spectrometer  
~~of~~ Fast Neutrons ~~XXXXX~~ According to Transit Time." Mos, 1957.  
7 pp 20 cm. (Academy of Sciences USSR), ~~15~~ 145 copies (KL, 27-57,104

BOGDANOV, G.F.

AUTHOR

BOGDANOV, G.F., VLASOV, N.A., KALININ, S.P., RYBAKOV, B.V., 89-9-2/32  
SIDOROV, V.A.

TITLE

The Li(p,n)Be reaction and the Fundamental Structure of the Be<sup>6</sup> Nucleus.  
(Reaktsiya(p,n) na litii i osnovnoye sostoyaniye yadra Be<sup>6</sup>)

PERIODICAL

Atomnaya Energiya, 1957, Vol 3, Nr 9, pp 204 - 210 (U.S.S.R.)

ABSTRACT

By means of the time of flight method the neutron spectrum emitted by the reactions Li<sup>6</sup>+p and Li<sup>7</sup>+p = 9 MeV is measured. Further, the redistribution of neutrons and the reaction cross sections were measured. The results are

- 1) Li<sup>6</sup>(p,n)Be<sup>6</sup>
  - a)  $Q_0 = -5.2 \pm 0.2$  MeV
  - b) the natural breadth of the ground state  $\Gamma < 0.3$  MeV
  - c) angular distribution of neutrons:  $\sigma(\theta) = 0.19 + 0.23 \cos(\theta) + 0.70 \cos^2(\theta)$  mb/steradian
  - d) mass defect of Be<sup>6</sup> =  $20.3 \pm 0.2$  MeV
  - e) Reaction cross section for the ground state at Ep=9 MeV  $\sigma = 5 \pm 1$  mb
- 2) Li<sup>7</sup>(p,n) Be<sup>7</sup>
  - a) The neutrons corresponding to the ground state, the level with 0.43 MeV and 4.65 MeV were found,
  - b) The angular distribution for the neutrons of the ground state and the 1st level is  $\sigma(\theta) = 6.8 + 2.4 \cos^2(\theta)$  mb/steradian
  - c) The total reaction cross section (forming of ground state and 1st

Card 1/2

The  $\text{Li}(p,n)\text{Be}$  Reaction and the Fundamental Structure of  
the  $\text{Be}^6$  Nucleus. .

89-9-2/32

level) at  $E_p = 9 \text{ MeV}$ :

$$\sigma = 100 \pm 20 \text{ mb}$$

3) The neutrons of the following reactions were observed:

$\text{Li}^6(p,pn) \text{Li}^5$

$\text{Li}^6(p,2pn) \text{He}^4$ .

(8 illustrations and 3 Slavic references).

ASSOCIATION Not Given.

PRESENTED BY

SUBMITTED 1.6.1957

AVAILABLE Library of Congress.

Card 2/2

21(7)

AUTHORS:

SOV/56-36-2-53/63

Bogdanov, G. F., Vlasov, N. A., Kalinin, S. P., Rybakov, B.V.,  
Samoylov, L. N., Sidorov, V. A.

TITLE:

The Reaction  $T(p,n)He^3$  at Proton Energies of 7 to 12 Mev  
(Reaktsiya  $T(p,n)He^3$  pri energii protonov 7 - 12 MeV)

PERIODICAL:

Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959,  
Vol 36, Nr 2, pp 633-636 (USSR)

ABSTRACT:

The present paper deals with the measurement of the cross sections and of the angular distributions of the reaction  $T(p,n)$  in the interval 7 - 12 Mev of proton energies. Moreover, the authors tried to measure the polarization of the neutrons in this reaction. A solid tritium-zirconium target (thickness 20  $\mu$ ) was bombarded by protons accelerated to 12 Mev in a cyclotron. The neutron flux was measured by a telescope consisting of 4 proportional counters and also by a spectrometer. The cross sections are measured with a precision of 10%. The first diagram shows the results of the measurement of the cross section under the angle  $0^\circ$  and previously published results of the measurements in the energy interval of 1 - 7 Mev. The cross section is approximately constant in the investigated energy interval, and it increases

Card 1/3

SOV/56-36-2-53/63

The Reaction  $T(p,n)He^3$  at Proton Energies of 7 to 12 Mev

slightly at energies of 11 - 12 Mev. The second diagram gives the angular distributions of the neutrons at the energies 6.8; 8.9; and 12 Mev. The high forward-backward anisotropy indicates an intense interference of the states of different parity. The curves given in the figures correspond to expressions of the type  $\sigma(\theta) = A + B\cos\theta + C\cos^2\theta + D\cos^3\theta + E\cos^4\theta$  in the c.m.s.. The coefficients of these expressions were calculated by the method of least squares and they are given in the following table:

$E_p$ (Mev)	A	B	C	D	E	$\sigma_t$ (mb)
6.8	11.1	11.3	24.4	-51.4	25.3	305
8.9	13.3	1.0	1.3	-28.4	27.3	241
12.0	13.0	7.5	-23.7	-24.9	44.6	176

The third diagram shows the energy dependence of the reaction. The investigation of the polarization of the neutrons produced in the reaction  $T(p,n)He^3$  is important for the determination of the characteristics of the excited states of an  $\alpha$ -particle. The inverse reaction  $He^3(n,p)T$  was investigated according to a method suggested by H. H. Barshall. According to this method,

Card 2/3

SOV/56-36-2-53/63

The Reaction  $T(p,n)He^3$  at Proton Energies of 7 to 12 Mev

the absolute values of the polarization can be measured without an analyzer of known polarization properties. According to the measurements discussed in the present paper, for  $E_p \lesssim 10$  Mev and for the angles satisfying Barshall's condition asymmetry is not higher than 5%. A noticeable asymmetry was observed in the case  $\theta_1 = \theta_2 = 40^\circ$ , and this asymmetry indicates a polarization of the neutrons.  $\theta_1$  denotes the angle under which the chamber filled with  $He^3$  (10 atmospheres) was placed in the neutron beam. By means of a telescope of proportional counters, the right-left asymmetry of the flying off of protons from the reaction  $He^3(n,p)T$  under the angle  $\theta_2$  was measured. There are 3 figures, 1 table, and 9 references, 6 of which are Soviet.

SUBMITTED: November 17, 1958

Card 3/3



22292

S/053/61/073/004/005/007  
B125/B201

26.2321  
26.2212

AUTHORS: Golovin, I. N., Artemenkov, L. I., Bogdanov, G. F.,  
Panov, D. A., Pistunovich, V. I., Semashko, N. N.

TITLE: Work with the thermonuclear installation "Ogra"

PERIODICAL: Uspekhi fizicheskikh nauk, v. 73, no. 4, 1961, 685-700

TEXT: The principal data concerning the installation "Ogra" were already published in 1958 by I. V. Kurchatov, "O nekotorykh rabotakh Instituta atomnoy energii AN SSSR po upravlyayemym termoyadernym reaktsiyam" (Atomnaya energiya 5, 105 (1958)). Both this paper and I. N. Golovin's lecture in London (1959) are presupposed to be known. Pinch current strength and conditions required for a dense plasma to accumulate in the "Ogra". In "pinch" operation, the density of plasma is made equal or larger than the density of hydrogen. The accumulation of hot plasma in the "Ogra" is above all dependent upon the following four cross sections:  
(a) the dissociation cross section  $\sigma_d$  of a molecular ion  $H_2^+$  in hydrogen,  
(b) the cross section  $\sigma_d^*$  of the dissociation of a molecular ion  $H_2^+$  by

Card 1/6

22292  
S/053/61/073/004/005/007  
B125/B201

Work with the thermonuclear...

protons, (c) the cross section  $\sigma_{ex}$  of the charge exchange of protons in hydrogen, (d) the cross section  $\sigma_{ion}$  of hydrogen ionization by protons. The values of  $\sigma_d$  used by the authors in 1958 had been measured by N. V. Fedorenko at LFTI (Leningrad Institute of Physics and Technology) in 1957. For conditions in the "Ogra", the equations for the balance of ions and neutrons read,

$$\frac{\alpha}{\Omega} J (n_0 \sigma_R + n \sigma_R^*) \mathcal{L} = n_0 n \sigma_n v, \quad (2.1)$$

$$\frac{1}{\Omega} J q = n_0 n \sigma_n v e + \frac{P}{\Omega} n_0. \quad (2.2)$$

The equation for the pinch current reads:

$$J_{nep} = \frac{1}{4} \frac{q}{\epsilon a^3} \frac{\Omega}{\mathcal{L}^2} \frac{v \sigma_n^*}{\sigma_R \sigma_R^* \sigma_n} \left\{ 1 - \frac{\alpha \mathcal{L}}{q} \frac{1}{\Omega} \frac{\sigma_R^*}{v \sigma_n} P \right\}^2 \quad (2.3)$$

for the density of plasma or hydrogen at the pinch:

$$n_{nep} = \frac{1}{2} \frac{q}{\epsilon a \mathcal{L}} \frac{\sigma_n}{\sigma_R \sigma_R^*} \left( 1 - \frac{\alpha \mathcal{L}}{q} \frac{1}{\Omega} \frac{\sigma_R^*}{v \sigma_n} P \right). \quad (2.4)$$

Card 2/6

22292

S/053/61/073/004/005/007

B125/B201

Work with the thermonuclear...

and

$$n_{0 \text{ nep}} = \frac{1}{2} \frac{q \sigma_n}{e a \mathcal{L} \sigma_n \sigma_n} \frac{\left(1 - \frac{a \mathcal{L} 1}{q} \frac{\sigma_n^2}{\Omega v \sigma_n} P\right)^2}{1 + \frac{a \mathcal{L} 1}{q} \frac{\sigma_n^2}{\Omega v \sigma_n} P} \quad (2.5)$$

respectively. The plasma-filled volume in the "Ogra" amounts to  $\Omega = 8 \cdot 10^6 \text{ cm}^3$ . Fig. 1 shows the principal cross sections characterizing the accumulation of a plasma in the "Ogra". Reference is made to measurements carried out by V. A. Simonov at the Nauchno-issledovatel'skiy vakuumnyy institut (Vacuum Scientific Research Institute). Part 3 deals with the stability, the space charge, and the cooling of ions by electrons. M. S. Ioffe and V. G. Tel'kovskiy have studied the adjusting instability (perstanovoch'naya neustoychivost'). According to O. B. Firsov, a strong asymmetry of the plasma may, in case of a positive azimuthal drive, lead to an ordered flux of ions toward the chamber wall. Part 4 deals with results of experiments made with the "Ogra": at the time while the present paper was written, certain parts of the "Ogra" were redesigned with a view to amplifying the induced flux of  $H_2^+$  ions, and to improving

Card 3/6

22292

S/053/61/073/004/005/007  
B125/B201

Work with the thermonuclear...

the vacuum conditions. I. G. Goncharov and Yu. N. Dnestrovskiy have devised a method of measuring very low electron densities in the "Ogra". V. T. Karpukhin has developed and built an interferometer operating on the 3-cm wavelength and serving for the measurement of the highest electron densities. There are always two plasma components in the chamber, a "hot" one and a cold one, the density of the cold component being considerably higher than that of the "hot" one if the pressures of remanent gases exceed  $10^{-7}$  mm Hg. At pressures below  $10^{-7}$  mm Hg, the densities of the two components become equal. The cold component has a considerably longer life than the hot one. The apparatus constructed by A. N. Karkhov permits receiving the magnetic radiation of ions in the whole spectrum. Yu. L. Sokolov has worked out special spectrometers for measuring the energy of plasma electrons from ultraviolet recombination radiation and from bremsstrahlung in the range of 1000-1 A. Part 5. Conclusions: From experiments with the "Ogra": in the case of weak amperages in the trap (10-20 milliamperes) the ion motion fits well the theory of motion of single particles, and the mean free path of molecular ions is longer than one kilometer. By a proper choice of the form of the magnetic field

Card 4/6

Work with the thermonuclear...

22292  
S/053/61/073/004/005/007  
B125/B201

it is possible to augment the mean free path even further, and to accumulate a plasma to proton densities of  $10^7 \text{ cm}^{-3}$ . Currents of 300 to 400 milliamperes can be reached. If necessary, it is possible, by improving the vacuum conditions, to reduce the current required for a very dense plasma to some dozen milliamperes if the energy of  $\text{H}_2^+$  ions is raised to 250-260 kev. Thus, the problem of accumulation of hot plasma with a density of  $10^9$  fast ions per  $\text{cm}^3$  and even more is by no means solved as yet. Research work has so far only reached the limit of those plasma densities, below which the ions move as non-interacting particles, and above which the hydrodynamic properties of plasma and the collective interactions of particles make themselves noticeable. The processes taking place in the "Ogra" have not been completely clarified by experiments. For example, it has not yet been explained why the plasma potential in some variants of the experiments attains dozens of kilovolts. Various possible explanations are offered. There are 12 figures and 15 references: 5 Soviet-bloc and 10 non-Soviet-bloc. The two most recent references to English-language publications read as follows:  
G. F. Bogdanov, D. A. Panov, N. N. Shemasko, Life time of fast ions in

Card 5/6

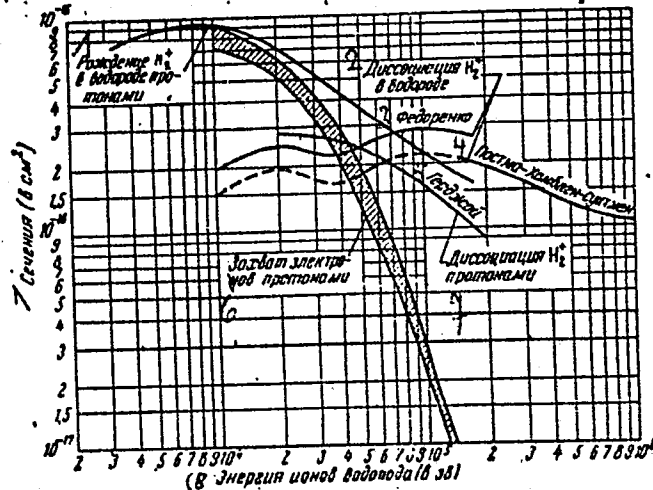
22292

S/053/61/073/004/005/007  
B125/B201

Work with the thermonuclear...

Ogra, J. Nucl. Energy, part C, III, 106 (1961); R. F. Post, R. E. Ellis, E. C. Fird, and M. N. Rosenbluth, Stable Confinement of a high temperature plasma, Phys. Rev. Lett. 4, 166 (1960).

Legend to Fig. 1: The most important cross sections determining the process of plasma accumulation in the "Ogra": 1, cross sections ( $\text{cm}^2$ ); 2, production of  $\text{H}_2^+$  in hydrogen by protons, dissociation of  $\text{H}_2^+$  in hydrogen; 3, Fedorenko; 4, Postma-Hamblen-Suitman; 5, Gerjoy; 6, capture of electrons by protons; 7, dissociation of  $\text{H}_2^+$  by protons; 8, energy of hydrogen ions (ev).



Card 6/6

BOGDANOV, G. F.

"Investigation of Plasmas in Ogra. "

Report presented at the Conference on Plasma Stability,  
Culham UK, 17-22 Sep '62

ACCESSION NR: AT4025307

S/0000/63/000/000/0173/0181

AUTHORS: Bogdanov, G. F.; Kozlov, P. I.; Maksimenko, B. P.

TITLE: Use of the field of the 'Ogra' itself for mass and energy analysis of fast ions emerging from a mirror

SOURCE: Diagnostika plazmy\* (Plasma diagnostics); sb. statey. Moscow, Goastomizdat, 1963, 173-181

TOPIC TAGS: plasma injection, plasma research, plasma instability, magnetic mirror, ionized plasma, mass spectrometer, ion mass analyzer, plasma density

ABSTRACT: A simple ion mass analyzer was developed for the stream of fast ions emerging from a mirror. In addition, a spectrometer was developed for the measurement of the energy spectrum of the ions. The two instruments were located in the region of maximum of the magnetic field of the "Ogra" apparatus, which was also used to separate

Card 1/5



ACCESSION NR: AT4025307

the ions. The analyzer was used to measure the distributions of the fluxes of atomic and molecular ions over the radius of the chamber at azimuth angles 0 and 180°. The spectrometer was used to obtain analogous distributions for 70 and 250°. These data were used to determine the fluxes of the ions emerging from the "Ogra" through the mirrors. It was established that the fluxes of the  $H_1^+$  and  $H_2^+$

ions are proportional to the current of the injected ions, and that the density of the atomic ions is higher in the unstabilized mode than would follow from data obtained with the aid of neutral-particle detector after turning off the injected current. The spectrometer was also used to investigate the spectra of atomic and molecular ions leaving the mirror. At plasma densities above  $10^6 \text{ cm}^{-3}$  the ion spectra have an anomalously great width which has not yet been explained. The construction and adjustment of the apparatus are described in detail. Orig. art. has: 4 figures and 2 tables.

Card 2/5

ACCESSION NR: AT4025307

ASSOCIATION: None

SUBMITTED: 19Oct63

DATE ACQ: 16Apr64

ENCL: 02

SUB CODE: ME

NR REF SOV: 001

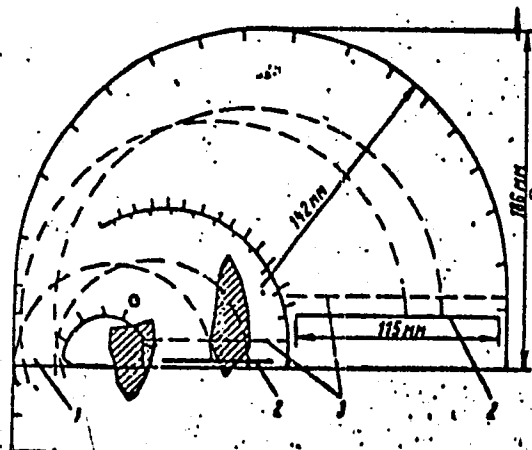
OTHER: 000

Card 3/5

ACCESSION NR: AT4025307

ENCLOSURE: 01

Diagram of ion mass analyzer



1 - entrance slit

2 - collector

3 - flange

shaded areas - geometric loci of Larmor centers of the ions entering the collector.

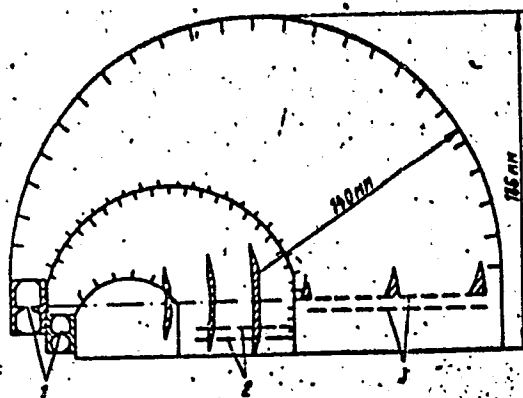
The magnetic field is perpendicular to the plane of the figure. The length of the slot and of the collector in the magnetic field direction is 120 mm

Card 4/5

ACCESSION NR: AT4025307

ENCLOSURE: 02

Diagram of spectrometer:



- 1 - entrance slit
- 2 - blades of  $H^+$  ion collector
- 3 - blades of  $H_2^+$  ion collector

Shaded areas - geometric loci of Larmor centers of molecular ions with fixed Larmor radii and line shape for three values of the Larmor radius. The 18 blades for the atom collectors and the 21 blades of the molecule collectors are arranged in two tiers.

Col 5/5

1 11239-66 ENT(m)/T/EWP(t)/EWP(h) LJP(c) JD  
ACC NR: AP6001696 SOURCE CODE: UR/0089/65/019/005/0449/0449

AUTHOR: Begdanov, G. F.; Maksimenko, B. P. 33  
55 55 28

ORG: none

TITLE: Use of surface-barrier silicon detectors for measuring spectra of fast particles ~7

SOURCE: Atomnaya energiya, v. 19, no. 5, 1965, 449

TOPIC TAGS: radiation detector, surface barrier silicon detector

19.55  
ABSTRACT: The possibility of using surface-barrier silicon counters for measuring spectra of charge-exchange neutral particles and ions with energies from 10 to 200 kev ejected from the "Ogra" device is briefly discussed. The counters were made of n-type silicon with a specific resistance of 700 ohm·cm and minority carrier lifetime of 2100 μsec. Their effective area was 5 cm<sup>2</sup> with a thickness of the gold coating of 25 μg/cm<sup>2</sup>. The reverse current for a 50-v bias did not exceed  $3.4 \times 10^{-8}$  amp. The counters were tested on a magnetic separator under a beam of protons with energies of 28, 29.7, 49.5 and 69.3 kev. The amplitude distribution of counter pulses during the recording of 28-kev protons is shown in Fig. 1. Fig. 2 shows the spectrum of neutral particles ejected from the "Ogra" chamber. This spectrum was

Card 1/2

UDC: 539.16.07  
2

L 11239-66

ACC NR: AP6001696

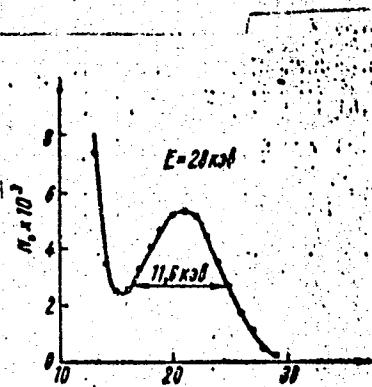


Fig. 1. Amplitude distribution of counter pulses during recording of 28-keV protons

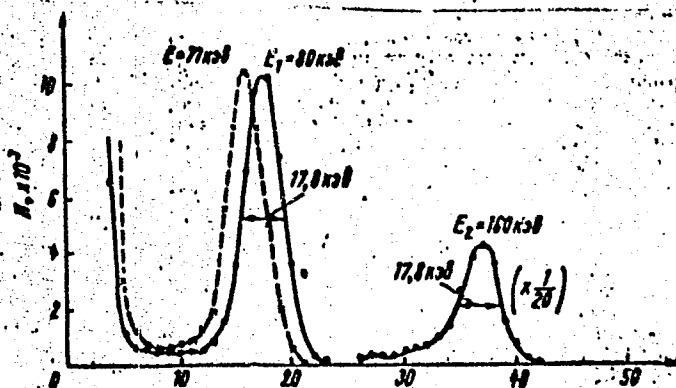


Fig. 2. Spectrum of neutral particles ejected from the "Ogra" chamber (dotted line - spectrum obtained when the window was covered by an aluminum foil)

measured when the energy spread of atomic ( $E_1 \approx 80$  keV) and molecular ( $E_2 \approx 160$  keV) neutral particles did not exceed 10%. Orig. art. has 2 figures. [JR]

SUB CODE: 18/ SUBM DATE: 26Apr65/ ORIG REF: 001/ ATD PRESS: 4173  
Cord 2/2

L 110697-65 EPT(n)-2/EPA(w)-2/ENT(1)/EW(m)/EWG(m)/EWA(m)-2 Po-4/P-4/Pz-6/Pab-10

IJP(c) AT/AM

ACCESSION NR: AT5006201

S/3136/64/000/676/0001/0115

AUTHOR: Artemenkov, L. I.; Bogdanov, G. P.; Golovin, I. N.; Karkhov, A. N.; Kozlov, P. I.; Kuznetsov, V. V.; Kucheryuyev, Yu. A.; Panov, D. A.; Pistunovich, V. I.; Semashko, N. N.; Timofeyev, A. P.

TITLE: Production of hot thermonuclear plasma by the method of injection of fast particles into a magnetic trap

SOURCE: Moscow. Institut atomnoy energii. Doklady, no. 676, 1964. O poluchenii gorachey termoyadernoy plazmy metodom inzhektsii bystrykh chastits v magnitnuyu lovishku, 1-115

TOPIC TAGS: hot plasma, thermonuclear reaction, magnetic trap, magnetic mirror, plasma injection, plasma density, flute instability, cyclotron instability

ABSTRACT: The article deals with the possibility of accumulating dense hot plasma in a magnetic trap with mirrors upon injection of fast molecular ions and neutral atoms. Experiments carried out with the Ogra installation on the accumulation of plasma in the dissociation of molecular ions by residual gas and in a lithium arc are described. The experiments have shown that the radial electric field hinders

Card 1/3

L 40697-65

ACCESSION NR: AT5006201

greatly the development of flute instability, the suppression of which is the most important condition for the successful accumulation of plasma in magnetic traps. In the presence of a sufficiently strong radial field, produced by the space charge of the plasma, the time for all the non-gas losses, due to scattering of ions by the residual gas, a hot plasma with density  $10^8$  ions/cm<sup>3</sup> was obtained. The principal physical obstacles to further increase in plasma density in symmetrical magnetic traps such as Ogra. The main obstacle is the development of flute instability. The analysis of all the available data is that plasma confinement is possible using only the internal electric fields of the plasma. The section contains: I. Introduction. 1.1 Principal problems in plasma confinement in magnetic traps. 1.2. Nonadiabatic losses, charge exchange, instabilities. 1.3. Cyclotron and other kinetic instabilities. 1.4. Role of the magnetic field in production of fast atoms in a trap with magnetic mirrors. 1.5. Latest results of experiments in Ogra I and Ogra II. II. Latest results of experiments in Ogra I. 2.1. Flute instability of plasma. 2.2. Suppression of flute instability with electric fields. 2.3.

Cont 2/3



I 40697-65

ACCESSION NR: AT5006201

Ion losses from the magnetic trap and plasma density. 2.5. Plasma potential. Loss of electrons from trap. 2.6. Cyclotron instability. 2.7. Ways of increasing plasma density in Ogra I. III. Conclusion. Orig. art. has: 30 figures, 3 formulas, and 4 tables.

ASSOCIATION: Institut atomnoy energii ia. I. V. Kurchatova (Institute of Atomic Energy)

SUBMITTED: 00

ENCL: 00

SUB CODE: MB

HR REF SOV: 029

OTHER: 025

Card 3/3 *mb*

BOGDANOV, G.F.; KARKHOV, A.N.; KUCHERYAYEV, Yu.A.

Dissociation of fast molecular hydrogen ions and the charge  
exchange of fast protons in a lithium arc. Atom. energ. 19  
no.4:381 0 '65. (MIRA 18:11)

BOGDANOV, G.G., kandidat tekhnicheskikh nauk.

Determining the interrelationship of length of drop and input depth  
on pressureless pipes. Transp.stroi. 6 no.9:26-27 S '56.  
(MIRA 9:11)

(Pipelines)

BOGDANOV, G.G., kandidat tekhnicheskikh nauk.

Calculating the length of hydraulic jumps. Gidr. stroi. 25 no.7:  
51-53 Ag '56. (MLRA 9:10)

(Hydraulic jump)

MITUPOV, Bato-Munko Mikhaylovich; BOGDANOV, G.G., ed.; BATOTSYRENOVA,  
D.B., tekhn.red.

[Development of industry and formation of a laboring class  
in the Buryat A.S.S.R.; 1923-1937] Razvitie promyshlennosti  
i formirovanie rabocheho klassa v Buriatskoi ASSR; 1923-1937  
gody. Ulan-Ude, Buriatskoe knizhnoe izd-vo, 1958. 142 p.  
(MIRA 12:8)

(Buryat-Mongolia--Industries)  
(Buryat-Mongolia--Labor and laboring classes)

BOGDANOV, G.G., kand.tekhn.nauk

Determining the length of channel sections undergoing serious  
erosion. Transp.stroi. 10 no.4:41-43 Ap '60. (MIRA 1319)  
(Hydraulic engineering)

BOGDANOV, G.G., kand.tekhn.nauk

Determining the length of a hydraulic jump. Gidr.stroi. 32  
no.4:42-44 Ap '62. (MIRA 15:4)  
(Hydraulic jump)

YEFIMOV, M.V., kand. biol. nauk, otv. red.; RAMPILOVA, M.A.,  
kand. sel'khoz. nauk, red.; PETROVICH, P.I., ml.  
nauchn. sotr., red.; BOGDANOV, G.G., red.

[Biology of forage plants of Buryatia] Voprosy biologii  
kormovykh rastenii Buriatii. Ulan-Ude, 1963. 161 p.  
(MIRA 18:7)

1. Ulan-Ude. Buryatskiy kompleksnyy nauchno-issledova-  
tel'skiy institut.



MYASNIKOV, A.A., kand.tekhn.nauk; KOLMAKOV, V.A.; BOGDANOV, G.G.

Control of methane liberation by changing ventilation systems in  
stoping sections. Vop.bezop.v ugol'.shakh. 4:22-35 '64.

(MIRA 18:1)

BOGDANOV, G.G., kand. tekhn. nauk

Selecting the reinforcement for streams crossed by small  
bridges and pipes. Transp. stroi. 15 no.4:42-44. 4p '65.  
(MIRA 18:6)

AL'PEROVICH, Yu.I.; GUTCHIN, I.B.; KAYEYSHEVA, L.S.; TEPLOV, L.P.;  
BOGDANOV, G.G.; DROBYSHEV, Yu.G.; SMIRNOV, G.V.;  
TRET'YAKOV, V.S.; BREYDO, M.I.; YEVSEYEV, L.A.; STEBAKOV,  
S.A.; FEDCHENKO, V., red.

[The ABC's of automation; collected articles] Azbuka avto-  
matiki; sbornik. Moskva, Molodaia gvardiia, 1964. 349 p.  
(MIRA 17:7)

AGOSHKOV, M.I.; BUD'KO, A.V.; ARUTYUNOV, K.G.; BOGDANOV, G.I.;  
KRIVENKOV, N.A.; Primali uchastiye: ZAMESOV, N.A.;  
GAGULIN, M.V.; KRASAVIN, G.A.; VORONYUK, A.S.;  
KOSTAN'YAN, A.Ya., red.izd-va; ASRAF'YEVA, G.A., tekhn.  
red.; SIMKINA, G.S., tekhn. red.

[Analysis of the development systems of mines in the Krivoy  
Rog Basin] Analiz sistem razrabotki rudnikov Krivorozhskogo  
basseina. Moskva, Izd-vo AN SSSR, 1963. 184 p.

(MIRA 17:3)

1. Chlen-korrespondent AN SSSR (for Agoshkov).

BUD'KO, A.V.; BOGDANOV, G.I.; TARAN, P.N.; LEVITSKIY, D.Z.

Study and improvement of chamber systems with mass pillar caving  
in the Krivoy Rog Basin. Gor.zhur. no.4:24-29 Ap '62.

(MIRA 15:4)

1. Institut gornogo dela im. Skochinskogo (for Bud'ko, Bogdanov).
2. Trest Leninruda, Krivoy Rog (for Taran, Levitskiy).  
(Krivoy Rog Basin--Iron mines and mining)

BUD'KO, A.V. Prinimali uchastiye: BOGDANOV, G.I.; ZAKALINSKIY,  
V.M.; KRIVENKOV, N.A.; TOLOCHKO, M.K.; MALAKHOV, G.M.,  
prof., doktor tekhn.nauk, redtsenzt

[Automation of stoping operations] Avtomatizatsiia ochi-  
stnykh rabot. Moskva, Izd-vo "Nedra," 1964. 133 p.  
(MIRA 17:6)

BOGDANOV, G.I. (Moskva)

Characteristics of pillar breaking by blasting. Izv. AN SSSR. Met. i  
gor. delo no.5:155-158 S-0 '64. (MIRA 18:1)

BUD'KO, A.V.; BOGDANOV, G.I.; LEVITSKIY, D.Z.; DROBOT, A.S.; YAKOVENKO, K.F.;  
MARCHENKO, A.A.; MATVEYEV, I.K.; LEONOV, B.A.; BAEENKO, V.T.

Pillar recovery in the Krivoy Rog Basin. Gor. zhur. no.5:22-24  
My '65. (MIRA 18:5)

1. Institut gornogo dela im. A.A.Skochinskogo, Moskva (for Bud'ko,  
Bogdanov). 2. Trest Leninruda (for Levitskiy). 3. Rudnik imeni  
R. Lyuksemburg (for all except Bud'ko, Bogdanov, Levitskiy).



BOGDANOV, G.N.

✓ Seasonal changes in the respiration of fishes. G. N.  
Bogdanov and S. V. Strel'tsova. *Izv. Vsesoyuz. Nauch.-  
Issledovatel. Inst. Osmotnogo i Rasknogo Rybnogo Khoz.* 33,  
103-15(1953); *Referat. Zhur., Khim.* 1954, No. 44839.  
B. Wierbicki

(1)

STREL'TSOVA, S.V.; BOGDANOV, G.N.

Changes in the respiration and hematological indices of carp during wintering. Trudy sov.Ikht.kom. no.8: 271-277 '58. (MIRA 11:11)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut ozernogo i rechnogo rybnogo khozyastva.

(Carp) (Cold--Physiological effect) (Fishes--Physiology)

STREL'TSOVA, S.V.; BRIZINOVA, P.N.; BOGDANOV, G.N.; OSTROUMOVA, I.N.

Physiological indices of the same species of fishes in different geographical locations. Vop. ekol. 5:208-209 '62. (MIRA 16:6)

1. Leningradskiy gosudarstvennyy nauchno-issledovatel'skiy institut  
chernogo i rechnogo rybnogo khozyaystva.  
(Fishes—Physiology)

BOGDANOV, G. N.

Bogdanov, G. N.

"Investigation of the possibility of obtaining hollow semifinished products by semiliquid rolling." Min Higher Education USSR. Moscow Inst of Nonferrous Metals and Gold imeni M. I. Kalinin. Chair of "The Technology of Metals." Moscow, 1956. (Dissertation for the Degree of Candidate in Technical Sciences).

SO: Knizhnaya letopis'  
No. 25, 1956. Moscow

SOV/137-59-3-6769

Translation from: Referativnyy zhurnal. Metallurgiya, 1959, Nr 3, p 263 (USSR)

AUTHORS: Severdenko, V. P., Bogdanov, G. N.

TITLE: Production of Hollow Articles by the Method of Semifluid Rolling (Polucheniye polykh tel metodom poluzhidkoy prokatki)

PERIODICAL: Sb. nauchnykh tr. Fiz.-tekhn. in-t AN BSSR, 1958, Nr 4, pp 3-36

ABSTRACT: In the process of semifluid rolling (SFR) of hollow articles (A), the preheated mold is set into rapid rotary motion. Liquid metal is poured into the mold through a casting spout inserted into the central opening in the mold cover. Under the action of centrifugal force the metal is pressed against the walls of the mold where, in the process of cooling, it begins to crystallize, starting on the surface adjoining the wall of the mold, while the metal in the regions closer to the center of the mold is still in a liquid state. In order to shape the internal surface of the semifluid metal, a roll (R) is introduced into the mold through the central opening. To avoid adhesion of liquid metal to the body of the R, the latter is continuously lubricated with transformer oil. Excess metal and slag are displaced onto the sides of the A where they solidify in the form of fins. A's with a

Card 1/3

SOV/137-59-3-6769

Production of Hollow Articles by the Method of Semifluid Rolling

stepped outer and a complex inner surface may be rolled by this method. SFR of Al-Cu alloys AL-12 (7-8% Cu) and AL-7 (up to 4.5% Cu) was investigated at velocities of rotation (VR) of the mold of 450, 750, and 1400 rpm. The maximum diameter of the R amounted to 60 mm, the minimum to 40 mm. The pressure of the R against the metal constituted 2, 5, 10, and 20 kg per each cm of the length of the R. At pressures of 2 and 5 kg/cm the condition of the inner surface was entirely satisfactory; at greater pressures, however, lateral cracks appeared and significant amounts of metal were ejected from the mold. During rolling of A's made of the AL-12 alloy, pouring of the metal preceded the introduction of the R into the mold by 15 seconds, the temperature of the alloy being 700°C at that time. The internal surface of the rolled A's exhibited an ellipticity amounting to 0.08-0.15 mm. The condition of the internal surface corresponded to a class-7 surface finish. The method of SFR results in a 5-25% saving of metal, this quantity being commonly wasted in the process of machining centrifugal castings. At lower VR of the mold the A's possess better and more homogeneous mechanical properties. As the VR is increased, the density of the castings is reduced. Compared with centrifugal castings rolled A's exhibit better and more homogeneous mechanical properties throughout their cross section. A's with a homogeneous, fine-grained structure may be obtained by the SFR method. Increasing the temperature of the melt (700, 750, and 800°) has an adverse effect on the mechanical properties of

Card 2/3

SOV/137-59-3-6769

Production of Hollow Articles by the Method of Semifluid Rolling

the A's. The temperature to which the mold is preheated (200, 250, and 300°) has little effect on the properties of the finished A's. Copper R's, characterized by their high thermal conductivity, impair the quality of the A's, best results being achieved with graphite R's which conduct heat to a considerably lesser degree. The method of SFR may be expediently employed in the manufacture of sliding-contact bearings made of alloys exhibiting tendencies toward gravity segregation. The internal zone of the rolled A's exhibits identical properties in longitudinal and tangential directions. With regard to strength characteristics, the mechanical properties of such A's exceed those of centrifugal castings by 25-30%, and with regard to plasticity by a factor of 1.5-2.

P. G.

Card 3/3

BOGDANOV, G. N.; YERSHOV, V. V.

Sterically hindered phenols. Report No. 10: Oxidation of  
phenols by lead tetraacetate. Izv. AN SSSR Otd. khim. nauk  
no.12:2145-2150 D '62. (MIRA 16:1)

1. Institut khimicheskoy fiziki AN SSSR.

(Phenols) (Oxidation) (Steric hindrance)



YERSHOV, V. V.; BOGDANOV, G. N.; VOLOD'KIN, A. A.

Sterically hindered phenols. Report No. 13: Reaction of 2,6-di-tert-butylbenzoquinone with organomagnesium compounds. Izv. AN SSSR. Otd. khim. nauk no.1:157-161 '63. (MIRA 16:1)

1. Institut khimicheskoy fiziki AN SSSR.

(Benzoquinone) (Magnesium organic compounds)  
(Steric hindrance)

BOGDANOV, G. N.; POSTNIKOVA, M. S.; EMANUEL<sup>1</sup>, N. M.

Formation of phenoxy radicals during the oxidation of phenols  
by lead tetraacetate. Izv. AN SSSR. Otd. khim. nauk no.1:  
173-175 '63. (MIRA 16:1)

1. Institut khimicheskoy fiziki ANSSSR.

(Phenols) (Phenoxy group) (Lead acetates)

L 12726-63 EPF(c)/EWT(m)/BDS Pr-h RM/WW  
 ACCESSION NR: AP3002290 S/0062/63/000/006/1084/1088

AUTHOR: Bogdanov, G. N.; Yershov, V. V. 59

TITLE: Sterically-hindered phenols. Report 15. Synthesis of para-substituted 2,6-di-tertiary butyl phenols 9

SOURCE: AN SSSR. Izv. Otdeleniye khimicheskikh nauk, no. 6, 1963, 1084-1088

TOPIC TAGS: sterically-hindered phenols, antioxidant, synthesis

ABSTRACT: A method for synthesizing 2,6-di-tertiary butyl-4-substituted phenols, based on reduction of the appropriate phenol with lithium aluminum hydride, was worked out. Thus, 2,6-di-tertiary butyl-4-methyl-; 4-ethyl-; 4-o-tolyl-; 4-p-tolyl-; 4-anisyl-; and 4-Alpha-naphthyl- phenols were prepared. Their antioxidant effectiveness was found to be about 3/4 that of ionol. "The authors express thanks to N. M. Emanyuel for constant interest in the work and process of its execution." Orig. art. has: 1 table, 1 figure, and 1 formula.

ASSOCIATION: Institut khimicheskoy fiziki, Akademii nauk SSSR (Institute of Chemical Physics, Academy of Sciences SSSR)

Card 1/2

L 15476-63

EPF(c)/EWT(m)/BDS AFFTC/ASD/APGC Pr-4 BW/RM/WW/MN

ACCESSION NR: AP3005457

S/0204/63/003/004/0594/0597  
67  
64

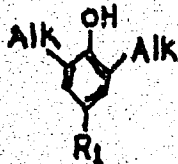
AUTHORS: Bogdanov, G. N.; Boldin, A. A.

TITLE: Influence of substituent's polarity effect upon the anti-oxidation activity of sterically hindered phenols

SOURCE: Neftekhimiya, v. 3, no. 4, 1963, 594-597

TOPIC TAGS: phenol antioxidation effects, butylphenol, OH-bond polarity, phenol

ABSTRACT: Authors studied the effect of  $R_1$  upon the anti-oxidation effect of 2,6-di-tert-butyl-4-substituted phenols: ↑



Card 1/2